NASA Procedural Requirements

COMPLIANCE IS MANDATORY

NPR 7123.1
Effective Date: March 13, 2006
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Subject: Systems Engineering Procedural Requirements

Responsible Office: Office of the Chief Engineer

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Preface

P.1 Purpose

The purpose of this document is to clearly articulate and establish the requirements on the implementing organization for performing, supporting, and evaluating systems engineering. Systems engineering is a logical systems approach performed by multidisciplinary teams to engineer and integrate NASA's systems to ensure NASA products meet customers' needs. Implementation of this systems approach will enhance NASA's core engineering, management, and scientific capabilities and processes to ensure safety and mission success, increase performance, and reduce cost. This systems approach is applied to all elements of a system and all hierarchical levels of a system over the complete project life cycle.

P.2 Applicability and Scope

a. This NASA Procedural Requirement (NPR) applies to NASA Headquarters and NASA Centers, including

component facilities and technical and service support centers. It also applies to the Jet Propulsion Laboratory to the extent specified in its contracts with NASA. This NPR applies to NASA employees and their service contractors that use NASA processes to augment and support NASA technical work. NASA NPRs and this Systems Engineering NPR (SE NPR) do not apply to NASA contracts except as the NASA technical team flows down the systems engineering responsibilities to all members of the system team including contractors and subcontractors. (See Chapter 4.)

b. The scope of this document encompasses the common technical processes for large and small projects and activities in flight systems and ground support (FS GS) projects, advanced technology development (ATD) projects with deliverables to FS GS projects, information systems and technology projects, and institutional projects (IP). Application of this NPR to Construction of Facilities (CoF) and Environmental Compliance and Restoration (ECR) projects (or portions thereof) should be scaled in accordance with the level of systems engineering for the function of the structure and documented in the systems engineering management plan (SEMP) (as required). In this sense, the design of facilities (or parts of facilities) for processing FS GS would require appropriate application of systems engineering effort, ensuring that interfaces with and functional requirements of the FS GS systems engineering are addressed. The design of administrative facilities or soil remediation projects may not require the application of specific systems engineering efforts. Engineering requirements for CoF and ECR projects are specified in NPR 8820.2 and NPR 8590.1, respectively. Applying the common technical processes and reviews may also benefit basic and applied research (BAR) and other ATD projects. They are recommended but not required for those BAR and ATD projects.

c. In this document, the word "project" generally refers to a unit of work performed in programs, projects, and activities. Management of a work unit is referred to as "project management," which includes managing programs, projects, and activities. A project is (1) A specific investment having defined goals, objectives, requirements, life-cycle cost, a beginning, and an end. A project yields new or revised products or services that directly address NASA's strategic needs. They may be performed wholly in-house; by Government, industry, academia partnerships; or through contracts with private industry. (2) A unit of work performed in programs, projects, and activities.

d. The requirements enumerated in this document are applicable to all new programs and projects as well as all programs and projects currently in Formulation Phase as of the effective date of this document. (See NPR 7120.5 for definitions of program phases.) This NPR also applies to programs and projects in their Implementation ;phase as of the effective date of this document. However, they may request permission from the designated governing authority to be allowed to continue without complying with all or sections of this NPR.

e. Many other discipline areas such as safety, reliability, maintainability, quality assurance, information technology security, logistics, environmental, etc. perform functions during project life-cycle phases that influence or are influenced by the engineering functions performed and need to be fully integrated with the engineering functions. The description of these disciplines and their relationship to the overall management life cycle are defined in other NASA directives, for example, the safety, reliability, maintainability, and quality assurance discipline pertinent requirement activities are defined in the 8700 series of directives.

P.3 Authority

a. 42 U.S.C. 2473(c)(1), Section 203(c)(1), National Aeronautics and Space Act of 1958, as amended.

b. NPD 1000.0, Strategic Management Governance Handbook.

c. NPD 1000.3, The NASA Organization.

d. NPD 7120.4, Program Project Management.

P.4 References

a. NPD 8700, NASA Safety and Mission Assurance (SMA) Policy documents.

b. NPR 7120.5, NASA Program and Project Management Processes and Requirements.

c. NPD 2820.1, NASA Software Policy.

d. NPR 7150.2, NASA Software Engineering Requirements.

e. NPR 8000.4, Risk Management Procedural Requirements.

f. SP-6105, NASA Systems Engineering Handbook.

g. NPD1080.1 NASA Science Policy.

h. NPR 1080.1 NASA Science Management.

i. NPR 8820.2 Facility Project Implementation Guide.

j. NPD 1440.6, NASA Records Management.

k. NPR 1441.1, NASA Records Retention Schedules.

/S/

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